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ABSTRACT

Some basic concerns about the proliferation of computers in schools are stated: (1) Educational goals for children should be established as a first priority, then what computers can do to help achieve those goals should be examined; (2) Very few pieces of software are useful in schools, and teacher education programs should explore what is needed in the context of good education; (3) Computers should be used more frequently in exploratory and non-structured ways; (4) Teachers should understand their own learning processes before they use computers as instructional media; (5) A computer can be used as an aid but cannot substitute for original thought; and (6) It is not really necessary for computer education to begin at a very young age. It is emphasized that the computer cannot teach anything but the basic materials programmed into it; a computer cannot substitute for creative thought or individual decision making. Implications for future teacher education programs are discussed with emphasis on the fact that the computer is a tool, not an area of study. (JD)

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The Implications for Teacher Education of Assuming that Schools of the Future Will Have Unlimited Access to Technology

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I have great concerns about the mad dash that is occuring to put computers in schools. I am not a technophobe, I am not a computer phobe, I am Chair of the Computer Education Programs in the Graduate School Division of Bank Street College of Education. I do a lot of outreach work in schools in the New York metropolitan area helping them set up computer programs for children.

As you might guess by the work that I do, I am, personally, passionate about computers. I can no longer write a speech or article (I can hardly write a note to a student) without one. I use a data base every day to look up student records, I love it when I must write a computer program for someone. Yet I am very worried about the impact of computers on education in general and, therefore, on teacher education. What I worry most about is that we are looking at the attributes of computers and teaching about them. We are not looking at the attributes of children and the nature of learning; we are not looking at how to use computers to further our educational goals for children.

In brief, my basic concerns about computers in education are the following:

1) We are looking at what the computer can do and then doing those things with computers in schools. We should look first at what our goals are in the education of children and then examine how computers can help us achieve those goals.

2) We don't really know what computers can do for education yet. All reports confirm the fact that there are very few pieces of software that are useful in schools. Why then are we buying millions of computers for our schools? We should have some tiny pockets of teachers and children working with computeres to see what they can do in the context of good education. And teacher education programs are one of the best places for this to be happening and studied.

3) To paraphrase Alfred North Whitehead in Aims of Education: A new phenomenon or material is exciting to teach or learn about, and then it becomes full of dry rot. When it gets systematized it gets boring. What happens to learning in most schools is that the juices are drained out before the material gets to the kids.

Here we are at a moment in history when some people are very excited about learning and computers. Why not let them use computers in their exciting non-structured ways?

4) Learning begins with the learner and we need to know who the learner is. The process of finding out about the learner starts with the teacher as a learner. How he/she learns. You don't have a clue that all others don't learn just as you do until you understand your own learning. You also forget how you learn unless you keep on looking at how you learn.

5) There is an element of magic concerning computers --Some myths about what they can do for people: Through the computer you can learn things that you could never learn any other way. The computer individualizes instruction. The computer is a better manager than a person. If you use a word processor you'll become a better writer. If you use a data base for filing, you'll be able to find something that you need. A computer will help you think. And, conversely, you won't have to think if you use a computer.

6) Another myth so powerful that it deserves mention in a category by itself is that people will need to know a lot about computers to get jobs in the future. Furthermore, computers are so hard to learn about that we must begin teaching children three and four years old about them or they will be left out of the future job market. This myth really bothers me since I learned almost all I needed to know about computers in my adult life and over a period of only a few years, and I learned it almost entirely on my own (as have so many adults and 10 to 16 year olds.)

WHAT COMPUTERS CAN'T DO:

They can't, for the most part, teach anything very important without input from a very fine teacher. For example:

1. Word processors can't teach writing. The word processor in the

hands of a very skilled teacher can enhance that teacher's already fine writing program by making it easier for children to edit their work, by facilitating collaboration between children on a piece of writing, by making it easier to have clear, correct copy to share with others on bulletin boards etc.

2. Computers cannot teach mathematics. Children may learn math facts on the computer (here again it takes a fine teacher to make use of the right software at the right moment for the child that needs it.) But to really understand mathematics a child needs to toss ideas around, the child needs to have a dialogue, manipulate materials etc. The use of the computer to aid in the process of learning real mathematics (i.e. problem solving, the relationship between multiplication and division or derivation and integration) takes intervention, planning and time on the part of a fine teacher.

3. The act of learning the computer language BASIC or Logo or Pascal will not teach problem solving or thinking skills. Again, a teacher with fine teaching skills and knowledge of a computer language can teach computer programming in ways that will promote problem solving skills. This will work especially well if the teacher is so fine that he/she makes it clear when the child can use those skills in other problem solving tasks.

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Computers are accepted already as cure-alls, educators and parents see them as magic machines. Why else would they cut the budget for library books in order to buy computers? Why else would they buy computers first and later decide what to do with them? Why else can schools get funds from federal and state governments for computers when they can barely get enough to provide decent lunches? Why are parents raising money for computers when they can't raise money for a gym teacher or an art teacher?

WHAT COMPUTERS CAN DO:

The computer's newness (And complexity) makes it a wonderful vehicle for helping teachers look not only at how they learn but who they are in relation to 1) the knowledge, and 2) the learner. For example, when a teacher is learning how to do something at the same time as a child is learning, the teacher stands in a different relationship to the learner. They (perhaps for the first time) are truly all in it together.

Computers have caught on in schools because kids are loving them and kids are getting great satisfaction because teachers do not know so much more than the kids -- in fact, perhaps even less. And we only have about three years left when this will be true.

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In fact two years ago I was a consultant to a school where they were just beginning to teach Logo to junior high school students. The children, for the most part, were having a wonderful time exploring the language, figuring out what it could do, working on projects that used what they had discovered. The teachers had learned the language the summer before and were very shaky. They were also very appreciative of what the children were accomplishing. I went back to that school this year and found that the teachers had devised booklets stating the projects children should learn to do. They were rushing them through the concepts and vocabulary of the language. They had erected Logo achievement levels for the children. The language was no longer one that could be explored and used but something one had to learn and achieve something in. The teachers were no longer shaky and the children's work was no longer genuinely appreciated.

What does this have to do with TEACHER EDUCATION?

1) What teachers need to learn is exactly the same thing they have always needed to learn -- You have to know who the children are who you are teaching, and what your goals are for educating them. Teacher education programs often do not address these questions.

2) One does not want to tack on a new course: Computers and Computer Methods to already over crowded teacher education programs. Just like one does not want to tack on Pencils and Pencil Methods. The

computer is a great big tool, not an area of study.

(If one should want to help children become computer scientists and not just users of computers the best way is to provide them with a fine mathematics program. This program should include not only the mechanics of math but the skills to explore further mathematical phenomenon and do genuine problem solving.)

The area of study is the teaching/learning process, and one way you study this is through having lots of different experiences with 1) children, 2) your own learning processes, and 3) materials and tools. Teacher education programs actually have to help teachers get their hands on these materials and tools and experience them in many different ways. Then they should talk about them, read about them, think about them, and go back and experience some more.

What we need to do is set up experiences (situations) for people to learn in and then discuss and reflect on those experiences and their implications for teaching.

Computer technology, being so new, is an excellent tool to use for reflecting on the teaching/learning process. When you learn something absolutely from scratch you can't help but look at your own learning. The personal experience of learning to use a computer, if noted in detail and reflected upon can give deep insight to the teacher. The following are statements paraphrased or

quoted from the papers of students in a course which aims at the understanding of the teaching/learning process through learning about the computer:

1. I found myself getting up very often to get water or see what others were doing.

2. I was one of a group of three learning about the speech synthesizer. The teacher was explaining and showing commands, I had to force myself to pay attention. I couldn't really understand until I had my hands on the computer.

3. It was wonderful to have a partner to turn to when I didn't understand.

4. I don't like to work with another person, it makes me too anxious. I need time for reflecting alone about what I have learned.

5. I could not stand to be interrupted when I was deeply involved in trying to solve a problem. I simply refused to stop until I had solved it.

6. "Teacher colleagues can learn to cooperate among themselves and, finally, with (not at) their students." (Christie Slimak)

7. "I approached computers with fear and even hostility until I was given time and space to reframe the problem as I saw it and to reach my own solutions at my own pace. When that happened, I was elated and I felt in control of the tool. It even caused a shift in my perception of myself. But it could so easily have happened the other way. I might have given up before I began if those small successes with Logo had not been so tempting." (Anne Sheppard)

At the end of her paper someone said: So what? So I learned about my own learning and I've learned about kids learning. But I have 32 children sitting in my classroom and most of them are failing. What do I do?

We're trying to figure out how to use the resources available in classrooms in behalf of these children. Well, one of these resources is the computer: in that it promotes kids teaching other kids; kids getting involved in a learning experience which stimulates them; kids taking charge of their own learning.

Computers can now do a lot of things that only people used to be able to do. For example, they can find the integral and derivative of a function. Do people still need to know how to do this? Do they still need to know this or long division or multiplication of fractions in the same way that they used to know them? Do kids still need to know how to use a dictionary if you have a spelling check in a computer? These are the issues we need to be thinking

about. We stil haven't come to grips with the fact that so many of us have calculators on our wrists.

We don't want to solve these problems; we want to raise them to consciousness because they deal with the basic issues of how people learn, what learning is all about, what knowledge is necessary, how knowledge is transmitted, and force teachers and educators to face the question of what education is all about.

The very smallest things that a teacher does in a classroom are probably the most important. (Like how you get kids quieted down.) The materials that you have in your room make a statement about how kids are expected to learn and what the teacher values. They provide the learning environment. If you have all workbooks and no art materials, you state that what's important to learn are procedures and facts. If you have all art materials and no class library, you really aren't interested in helping kids enjoy reading. If you have a computer and no clay or storybooks or growing things, you've also made a statement of what you see as important in life and learning.